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10/697,781	10/30/2003	Chao Kan	139144USNP	8886

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EXAMINER	
DUONG, CHRISTINE T	
ART UNIT	PAPER NUMBER
2616	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/697,781	KAN ET AL.	
	Examiner	Art Unit	
	Christine Duong	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,3-12,16 and 18-21 is/are rejected.

7)☒ Claim(s) 2,13-15,17 and 22 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 30 October 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 01/10/2005.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The references listed in the Information Disclosure Statement, filed on January 10, 2005, have been considered by the examiner (see attached PTO-1449 form or PTO/SB/08A and 08B forms).

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "weight optimizer 42" as described in the Specification on Page 9, Line 24. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. **Claim 10** is objected to because of the following informalities:

Because of the limitation "the internet protocol network" in Line 1, it is believed **Claim 10** was intended to depend on Claim 9 and has been treated as such for the remainder of this Office Action. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 3-6,9-12, 16, 18-19** are rejected under 35 U.S.C. 102(e) as being anticipated by Liao et al. (PG Pub US 2004/0136379 A1).

Regarding **Claims 1** and **16**, Liao et al. discloses a network system **(network, Fig. 18)**, comprising:

a plurality of nodes **(routing modules 1808a and 1808b, ingress modules 1810, egress modules 1812, etc., Fig. 18)**;

wherein each node in the plurality of nodes is coupled to communicate with at least one other node in the plurality of nodes **("The data packet 1824 is sent to routing module 1808a, which directs the data packet to one of the egress modules 1812 according to the intended destination of the data packet 1824", [0047] Lines 2-5, Fig. 18)**; and

wherein each node of the plurality of nodes comprises a plurality of queues **("Each of the routing modules 1808a and 1808b can include a data buffer 1820a or 1820b which can be used to store data", [0047] Lines 5-7)** and is operable to perform the steps of:

receiving a plurality of packets **("Each of the routing modules 1808a and 1808b can include a data buffer 1820a or 1820b which can be used to store data which is difficult to transmit immediately due to, e.g., limitations and/or bottlenecks in the various downstream resources needed to transmit the data", [0047] Lines 5-10)**;

for each received packet in the plurality of packets, coupling the received packet into a selected queue in the plurality of queues **("controls the parameters used by a scheduler algorithm which separates data traffic into one or more queues (e.g., sequences of data stored within one or more memory buffers)", [0049] Lines 4-7)** wherein a respective selected queue is selected in response to the respective received packet satisfying one or more criteria **("A data packet can be categorized by, e.g., the Internet Protocol ("IP") address of the sender and/or the recipient, by the particular ingress through which the data entered the network, by the particular egress through which the data will leave the network, or by information included in the header of the packet, particularly in the 6-bit "differentiated service codepoint" (a/k/a the "classification field")", [0049] Lines 20-27)**; and

assigning a weight to each respective queues in the plurality of queues, wherein each weight assigned to a respective queue in the plurality of queues is responsive to

quality requirements for each packet in the respective queue **("the data packets can be categorized into various categories, and each category assigned a "service weight" which determines the relative rate at which data within the category is released", [0049] Lines 9-12)** and to a ratio of packet arrival variance in the respective queue **("The instantaneous packet loss is then calculated by determining the ratio between packet drops and arrivals", [0095] Lines 13-15)** and a mean of packets arriving to be stored in the respective queue during a time interval **("mean traffic rate and mean service time", [0064] Lines 1-2)**.

Regarding **Claims 3** and **18**, Liao et al. discloses everything claimed as applied above (see *Claims 1* and *16*). In addition, Liao et al. discloses

each node of the plurality of nodes is further operable to perform the step of scheduling transmission of packets from each queue of the plurality of queues in response to a respective weight, from the plurality of weights, assigned to the queue **("controls the parameters used by a scheduler algorithm which separates data traffic into one or more queues (e.g., sequences of data stored within one or more memory buffers) and makes decisions regarding if and when to release particular data packets to the output or outputs of the router. For example, the data packets can be categorized into various categories, and each category assigned a "service weight" which determines the relative rate at which data within the category is released", [0049] Lines 4-12)**.

Regarding **Claims 4** and **19**, Liao et al. discloses everything claimed as applied above (see *Claims 1* and *16*). In addition, Liao et al. discloses

each received packet comprises an IP packet **("a data packet can be categorized by, e.g., the Internet Protocol ("IP") address of the sender and/or the recipient", [0049] Lines 20-22)** and wherein the quality requirements comprise QoS **("The node provisioning system first measures a relevant network parameter, such as the amount of usage of a network resource, the amount of traffic passing through a portion of the network such as a link or a router, or a parameter related to service quality (step 302). Preferably, the parameter is either delay or packet loss, both of which are indicators of service quality", [0097] Lines 3-9)**.

Regarding **Claim 5**, Liao et al. discloses everything claimed as applied above (see *Claim 1*). In addition, Liao et al. discloses

each packet in the plurality of packets comprises a respective packet header; and wherein the one or more criteria are evaluated relative to information in the packet header **("A data packet can be categorized by, e.g., the Internet Protocol ("IP") address of the sender and/or the recipient, by the particular ingress through which the data entered the network, by the particular egress through which the data will leave the network, or by information included in the header of the packet, particularly in the 6-bit "differentiated service codepoint" (a/k/a the "classification field")", [0049] Lines 20-27)**.

Regarding **Claim 6**, Liao et al. discloses everything claimed as applied above (see *Claim 5*). In addition, Liao et al. discloses

the one or more criteria are selected from a set consisting of source address, destination address, protocol field, type of service field, and source/destination port

numbers **("A data packet can be categorized by, e.g., the Internet Protocol ("IP") address of the sender and/or the recipient, by the particular ingress through which the data entered the network, by the particular egress through which the data will leave the network, or by information included in the header of the packet, particularly in the 6-bit "differentiated service codepoint" (a/k/a the "classification field")", [0049] Lines 20-27)**.

Regarding **Claim 9**, Liao et al. discloses everything claimed as applied above (see *Claim 1*). In addition, Liao et al. discloses

the network comprises an internet protocol network **("a data packet can be categorized by, e.g., the Internet Protocol ("IP") address of the sender and/or the recipient", [0049] Lines 20-22 and therefore the data packet would be used in an Internet Protocol network)**.

Regarding **Claim 10**, Liao et al. discloses everything claimed as applied above (see *Claim 9*). In addition, Liao et al. discloses

the internet protocol network comprises the global internet **("a data packet can be categorized by, e.g., the Internet Protocol ("IP") address of the sender and/or the recipient", [0049] Lines 20-22 and therefore the data packet would be used in an Internet Protocol network and further "networks – e.g., the Internet", [0002] Lines 2-3)**.

Regarding **Claim 11**, Liao et al. discloses everything claimed as applied above (see *Claim 1*). In addition, Liao et al. discloses

each node of the plurality of nodes is selected from a set consisting of a router and a switch **("the network of FIG. 18 includes routing modules 1808a and 1808b", [0045] Lines 4-5).**

Regarding **Claim 12**, Liao et al. discloses everything claimed as applied above (see *Claim 1*). In addition, Liao et al. discloses

each node of the plurality of nodes is selected from a set consisting of an edge router and a core router **("The ingress modules 1810 and the egress modules 1812 can also be referred to as edge modules", [0045] Lines 6-8)**.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 7-8, 20-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Liao et al. further in view of Costas Courcoubetis, Vasilios A. Siris and George D. Stamoulis ("Application of the many sources asymptotic and effective bandwidths to traffic engineering", Telecommunication Systems 12 (1999) 1-27).

Regarding **Claim 7**, Liao et al. discloses everything claimed as applied above (see *Claim 5*). However, Liao et al. fails to specifically disclose that each weight is responsive to quality requirements by responding to effective bandwidth *Eb*;

wherein *Eb* is defined as: $Eb = \frac{1}{st} \cdot \log E[e^{(s \cdot A_t)}]$;

wherein *At* is an amount of incoming work in duration of *t*; and

wherein *(s, t)* are space and time parameters, respectively, which characterize an operating point at a link to the node.

Nevertheless, Courcoubetis, Siris and Stamoulis teach **"Let *Xj*[0,*t*] be the total load produced by a source of type *j* in the time interval [0,*t*), which feeds the above link. We assume that *Xj*[0,*t*] has stationary increments. Then, the effective bandwidth of a source of type *j* is defined as** $\alpha j(s,t) = \frac{1}{st} \log E[e^{sXj[0,t]}]$**, where *s,t* are system parameters which are defined by the context of the source, i.e., the characteristics of the multiplexed traffic, their QoS requirements, and the link resources (capacity and buffer). Specifically, the *time* parameter *t* (measured in, e.g., milliseconds) corresponds to the most probable duration of the buffer busy period prior to overflow. The *space* parameter *s* (measured in, e.g., kb^{-1}) is an indication of the degree of multiplexing and depends, among others, on the size of the peak rates of the multiplexed sources relative to the link capacity (Page 4, Lines 1-12).**

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Liao et al.'s queue weight to be responsive to effective bandwidth because **"it takes into account the effects of statistical multiplexing" (Page 6, Lines 17-18).**

Regarding **Claim 8**, Liao et al. discloses everything claimed as applied above (see *Claim 1*). However, Liao et al. fails to specifically disclose that each weight is responsive to quality requirements by responding to effective bandwidth *Eb*;

wherein *Eb* is defined as: $Eb = \frac{1}{st} \cdot \log E[e^{(s \cdot A_t)}]$;

wherein *At* is an amount of incoming work in duration of *t*; and

wherein *(s, t)* are space and time parameters, respectively, which characterize an operating point at a link to the node.

Nevertheless, Courcoubetis, Siris and Stamoulis teach **"Let *Xj*[0,*t*] be the total load produced by a source of type *j* in the time interval [0,*t*), which feeds the above link. We assume that *Xj*[0,*t*] has stationary increments. Then, the effective bandwidth of a source of type *j* is defined as** $\alpha j(s,t) = \frac{1}{st} \log E[e^{sXj[0,t]}]$**, where *s,t* are system parameters which are defined by the context of the source, i.e., the characteristics of the multiplexed traffic, their QoS requirements, and the link resources (capacity and buffer). Specifically, the *time* parameter *t* (measured in, e.g., milliseconds) corresponds to the most probable duration of the buffer busy period prior to overflow. The *space* parameter *s* (measured in, e.g., kb^{-1}) is an indication of the degree of multiplexing and depends, among others, on the size of the peak rates of the multiplexed sources relative to the link capacity (Page 4, Lines 1-12).**

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Liao et al.'s queue weight to be responsive to effective bandwidth because **"it takes into account the effects of statistical multiplexing" (Page 6, Lines 17-18).**

Regarding **Claim 20**, Liao et al. discloses everything claimed as applied above (see *Claim 19*). However, Liao et al. fails to specifically disclose that each weight is responsive to quality requirements by responding to effective bandwidth *Eb*;

wherein *Eb* is defined as: $Eb = \frac{1}{st} \cdot \log E[e^{(s \cdot A_t)}]$;

wherein *At* is an amount of incoming work in duration of *t*; and

wherein *(s, t)* are space and time parameters, respectively, which characterize an operating point at a link to the node.

Nevertheless, Courcoubetis, Siris and Stamoulis teach **"Let *Xj*[0,*t*] be the total load produced by a source of type *j* in the time interval [0,*t*), which feeds the above link. We assume that *Xj*[0,*t*] has stationary increments. Then, the effective bandwidth of a source of type *j* is defined as $\alpha j(s,t) = \frac{1}{st} \log E[e^{sXj[0,t]}]$, where *s,t* are system parameters which are defined by the context of the source, i.e., the characteristics of the multiplexed traffic, their QoS requirements, and the link resources (capacity and buffer). Specifically, the *time* parameter *t* (measured in, e.g., milliseconds) corresponds to the most probable duration of the buffer busy period prior to overflow. The *space* parameter *s* (measured in, e.g., kb^{-1}) is an indication of the degree of multiplexing and depends, among others, on the size of the peak rates of the multiplexed sources relative to the link capacity (Page 4, Lines 1-12).**

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Liao et al.'s queue weight to be responsive

to effective bandwidth because **"it takes into account the effects of statistical multiplexing" (Page 6, Lines 17-18).**

Regarding **Claim 21**, Liao et al. discloses everything claimed as applied above (see *Claim 16*). However, Liao et al. fails to specifically disclose that each weight is responsive to quality requirements by responding to effective bandwidth *Eb*;

wherein *Eb* is defined as: $Eb = \frac{1}{st} \cdot \log E[e^{(s \cdot A_t)}]$;

wherein *At* is an amount of incoming work in duration of *t*; and

wherein *(s, t)* are space and time parameters, respectively, which characterize an operating point at a link to the node.

Nevertheless, Courcoubetis, Siris and Stamoulis teach **"Let *Xj*[0,*t*] be the total load produced by a source of type *j* in the time interval [0,*t*), which feeds the above link. We assume that *Xj*[0,*t*] has stationary increments. Then, the effective bandwidth of a source of type *j* is defined as** $\alpha j(s,t) = \frac{1}{st} \log E[e^{sXj[0,t]}]$**, where *s,t* are system parameters which are defined by the context of the source, i.e., the characteristics of the multiplexed traffic, their QoS requirements, and the link resources (capacity and buffer). Specifically, the *time* parameter *t* (measured in, e.g., milliseconds) corresponds to the most probable duration of the buffer busy period prior to overflow. The *space* parameter *s* (measured in, e.g., kb^{-1}) is an indication of the degree of multiplexing and depends, among others, on the size of the peak rates of the multiplexed sources relative to the link capacity (Page 4, Lines 1-12).**

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Liao et al.'s queue weight to be responsive to effective bandwidth because **"it takes into account the effects of statistical multiplexing" (Page 6, Lines 17-18).**

Allowable Subject Matter

8. **Claims 2, 13-15, 17,** and **22** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Citations of Pertinent Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Moore (PG Pub US 2005/0226249 A1) discloses dynamic allocation of network resource through the use of a measurement-based estimator.

Lu et al. (US Patent No. 6,473,815 B1) discloses queue sharing methods and apparatus of a queuing system which includes queues of multiple priorities or classes.

Galand et al. (US Patent No. 6,188,698 B1) discloses a packet scheduling system for use in a switching node of a high speed packet switching network. Incoming packets are enqueued in connection queues.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Duong whose telephone number is (571) 270-1664. The examiner can normally be reached on Monday - Friday: 830 AM-6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CTD 06/29/2007 CTD

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